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DURUM WHEAT



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QUALITY REPORT

Physical, Chemical, Milling, and Macaroni Characteristics

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
CROPS RESEARCH DIVISION

and

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF CEREAL TECHNOLOGY

(F2000)
L. J. ...
...

DURUM WHEAT



QUALITY REPORT

Physical & chemical analysis and laboratory examination

ANALYSIS OF DURUM WHEAT
BY THE
FEDERAL BUREAU OF INVESTIGATION
U. S. DEPARTMENT OF JUSTICE
WASHINGTON, D. C.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Crops Research Division

and

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION
Department of Cereal Technology

Preliminary Report not for Publication 1/

QUALITY EVALUATION OF DURUM WHEAT VARIETIES
1962 Crop 2/

by

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1/ This is a progress report of cooperative investigations containing data, the interpretation of which may be modified with additional experimentation. Therefore, publication, display, or distribution of any data or statements herein should not be made without written approval of the Crops Research Division, ARS, USDA, and the cooperating agencies concerned.

2/ Cooperative investigations of the Crops Research Division, Agricultural Research Service, and the Department of Cereal Technology, North Dakota State University. The samples were obtained from the cooperative experiments with the State agricultural experiment stations in the durum wheat region.

Spring and Durum Wheat Quality Laboratory
Fargo, North Dakota
CR-59-63

COOPERATIVE AGENCIES, STATIONS AND PERSONNEL

The cooperating agencies, stations and personnel conducting the varietal plot and nursery experiments concerned with these durum tests in 1962 were as follows:

Minnesota Agricultural Experiment Station

St. Paul, Crookston, Morris: E. R. Ausemus*, O. C. Soine, Roy Thompson.

North Dakota Agricultural Experiment Station

Fargo, Langdon, Minot, Mandan, Dickinson, Williston, Carrington, Edgeley: K. L. Lebsock*, Victor Sturlagson, G. N. Geizler.

South Dakota Agricultural Experiment Station

Brookings, Watertown, Eureka, Highmore: D. G. Wells, Q. Kingsley.

Washington Agricultural Experiment Station

Pullman: Calvin F. Konzak.

Oregon State University

Corvallis: W. H. Foote.

* These are ARS Employees.

INTRODUCTION

For the first time this year, all the samples of standard varieties and any new strains of durum wheat grown in cooperative experiments in the durum wheat region of the United States 3/ have been milled and evaluated by the Hard Red Spring and Durum Wheat Quality Laboratory on the campus of North Dakota State University at Fargo, North Dakota. Since the evaluation program of durum wheats has been integrated with the work done by the Cereal Technology Department of North Dakota State University, the majority of samples were processed in their laboratory. As was pointed out in last year's report, the processing techniques and evaluation methods of the Cereal Technology Department are not identical with those used in previous years by the Hard Red Spring and Durum Wheat Quality Laboratory when it was located at Beltsville, Maryland; therefore, the data given in previous reports are somewhat different. It was necessary to change the methods of evaluation (not affecting ultimate gradings) to effect the comparability of scoring between the two laboratories, and this was noted in the cases where differences did occur in last year's report (CR-82-62). Therefore, these differences will not be specifically pointed out in this report or explained; however, for sufficient understanding, methods and techniques are described in detail in the text of the report.

Where sufficient quantity of sample was available, the semolina was processed into macaroni to determine the quality characteristics. Other tests performed were dependent upon the quantity of semolina or durum wheat. When sufficient quantity of durum wheat was available for making macro macaroni, several strands of macaroni were produced from the sample. When the quantity was insufficient, only single strands of macaroni were produced.

The purpose of this report is to make available to cooperators the quality data on standard varieties and new strains of durum wheat from the 1962 crop.

3/ Ausemus, E. R., Results on Spring Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1961. U. S. Department of Agriculture, Agricultural Research Service, Crops Research Division, CR-3-63. 66 pp.

SOURCE OF THE SAMPLES

Three-hundred and seventy-six samples were received from 18 stations of the states of Minnesota, North Dakota, South Dakota, Oregon, and Washington for durum wheat quality tests. Approximately one-fourth of the samples tested were of the named commercial varieties of Mindum, Langdon, Wells, Lakota, Sentry, Ramsey, and Yuma. The remaining samples were either new varieties or samples received from a special test for quality evaluation.

Seventy-two samples were from the field plots grown in Minnesota, South Dakota, and North Dakota.

Sixteen samples were dwarf durums grown at Langdon, North Dakota.

Sixty-four samples were uniform nursery samples grown at Crookston, Minnesota; blend of Eureka and Watertown samples from South Dakota, and Langdon and Minot, North Dakota. The Morris, Minnesota samples were badly damaged (primarily by scab) this year, as well as the Brookings, South Dakota samples, and were therefore not processed.

Seventy-five samples were received from Prosser, Washington of the semi-dwarf durum type.

Ninety-four samples of single row nursery new varieties grown at Langdon and Fargo, North Dakota were processed. Forty-four of these samples had been originally increased in Mexico, prior to increasing at the Langdon-Fargo stations.

Seventeen samples were received of Sentry grown in the Klamath Falls area of Oregon. These samples were grown on different farms in the area.

Eight commercial samples from Project 47 were processed. These samples represented composites of carlot receipts of durum wheat received at Duluth, Minnesota and submitted by the Grain Division, AMS.

METHODS

The methods used in the testing of the samples were essentially the same as given in last year's report with the addition of some new tests and interpretations of the tests.

Briefly, the following methods and terminologies were applied:

Test Weight per Bushel - The weight per Winchester bushel of dockage-free wheat.

Thousand Kernel Weight - The 1000 kernel weight was determined by counting the number of kernels in a 10 g. sample of cleaned, picked wheat with an Asco Seed Counter 4/.

The Kernel Size - The percentage of the size of the kernels (large, medium, and small) was determined on a wheat sizer as described by Shuey 5/.

The sieves of the sizer were clothed as follows:

Top Sieve - Tyler #7 with 2.92 mm. opening,
Middle Sieve - Tyler #9 with 2.34 mm. opening,
Bottom Sieve - Tyler #12 with 1.65 mm. opening.

Milling - Except for the Prosser samples, the samples were milled and tested in cooperation with the Department of Cereal Technology, North Dakota State University. The dockage-free wheat was tempered in two stages; first to 13-1/2% moisture for 18 hours, then to 15-1/2% one hour before milling. The method is essentially the same as described by Harris and Sibbitt 6/.

The Prosser, Washington samples were milled on a modified Brabender Quadromat Junior Mill. The #4 roll was replaced by a wooden blank plug. The drum sieve was clothed with #18 wire. The thoroughness of the #18 wire were sifted on a Strand sifter equipped with a #40 Tyler sieve. The sample was tempered to 13-1/2% and allowed to stand overnight. An additional 2-1/2% moisture was added to the sample

4/ Mention of a trade product, equipment, or a commercial company in this publication does not imply its endorsement by the United States Department of Agriculture over similar products or companies not named.

5/ Shuey, William C. A Wheat Sizing Technique for Predicting Flour Milling Yield. Cereal Science Today 5:71-72, 75. 1960.

6/ Harris, R. H., and Sibbitt, L. D. Experimental Durum Milling and Processing Equipment with Further Quality Studies on North Dakota Durum Wheats. Cereal Chemistry 19:388-402. 1942.

one-half hour before milling. The sample was sifted on the Tyler wire for one-half minute. The throughs of the #40 wire were classified as unpurified semolina and this was the material which was tested.

Protein Content - The protein was calculated by multiplying by the factor of 5.7 the percent nitrogen as determined by the standard Kjeldahl procedure.

Mineral Content or Ash Content - This was determined by measuring the residue of the minerals left after incinerating the sample for approximately 16 hours at 600° C. The results were reported as percentage of the sample which was incinerated.

Absorption - This was the water, expressed as percent of the semolina required to bring the dough to the proper consistency.

All values (protein, ash, absorption) are reported on a 14% moisture basis.

Carotenoid Pigments - These were measured with the spectrophotometer at 440 mμ as color, intensity of water-saturated N-butanol extract of ground wheat or semolina. The concentration of pigment is calculated by the formula:

$$C = \frac{(-\log_{10} T)}{b K} \quad \text{Where } C = \text{Parts Per Million (p.p.m.) carotene}$$

T = Transmittance, and
K = 1.6632 7/
b = Cell Length cm.

The Color Score - The color of the macaroni or semolina has been generally accepted as the most important single grading factor. A deep amber or golden color is the most preferable. The amount of yellow pigmentation determined the extent or degree of amberiness. The following grading system has been adopted for scoring the color of macaroni and semolina.

7/ American Association of Cereal Chemists, Incorporated, Cereal Laboratory Methods, 7th Edition, St. Paul, Minnesota. AACC Methods 14-50, 1962.

<u>Color Score 8/</u>	<u>Description</u>
12	Much deeper and intense yellow pigmentation than standard.
11	Deeper and more intense yellow pigmentation than standard.
10	Standard Quality, depth and intensity of yellow pigmentation.
9	Slightly less depth and intensity, but sufficient quantity of pigmentation.
8	Slightly less quantity as well as depth and intensity of pigmentation than the standard but still sufficient to be rated satisfactory on the basis of color.
7	Sufficiently less quantity of yellow pigmentation than the standard to give a pale yellow color and graded unsatisfactory for color score.
6	Sufficiently less quantity of yellow pigmentation than the standard to give a very pale yellow color.
5	Only a sufficient quantity of yellow pigmentation to indicate an off-white color with a yellow hue.

The numerical rating describes the depth or amount of pigmentation.

8/ Samples which have a color rating below 8 are unsatisfactory. It is possible that the average color score for a crop year maybe higher or lower than average, therefore, this would be taken into consideration when giving the overall rating of a variety for that given year. A sample may receive a low rating for reasons other than a deficiency of yellow pigmentation such as: dullness, D; greyness, G; redness, R; brownness, B; chalkiness, or white cast, W; and speckiness, S; or a combination of these factors. The sample will be rated accordingly with the exception of the intensity, quantity and depth of the yellow pigmentation.

In cases where a sample is graded down because of off-color, speckiness, etc., the designation is shown by a letter abbreviation following the numerical score. For example: a 4W would indicate the sample was chalky white with little or no yellow pigmentation, a 6 D would indicate the sample had some yellow pigmentation, but was dull.

Dust Color Score - This is determined by slicking the sample with a standard of known color rating and comparing the two.

Slick Color Score - This is determined by using a modified Pekar test.

Lipoxidase - This is the enzyme responsible for the destruction of the carotenoid (yellow) pigments during the manufacture of the macaroni. Some destruction of color is inevitable, but there is evidence that excessive concentrations of the enzyme may reduce the amounts of yellow pigments so that the color characteristics of the finished product are unsatisfactory.

The method used for the estimation of lipoxidase is essentially that developed by Irvine and Anderson 9/. The results are reported as microliters of oxygen taken up per minute per gram of sample.

Mixogram, Farinogram - The mixograph has been used when the sample was too small for the farinograph. Either instrument yields a graphic record of the progressive changes in dough characteristics during the mixing process. A descriptive term relative to strength has been used to describe the curve rather than numerical values. The reference mixogram and farinogram patterns are shown at the end of the report.

Macaroni - Six hundred grams of semolina are mixed with water to form a stiff dough which is then pressed into macaroni and dried. The equipment and procedure have been described by Sibbitt and Harris 6/ and by Fifield 10/.

6/ Harris and Sibbitt, loc. cit.

9/ Irvine, G. N., and Anderson, J. A. Variations in Principal Quality Factors of Durum Wheats with a Quality Prediction Test for Wheat or Semolina.

10/ Fifield, C. C. Experimental Equipment for Manufacture of Alimentary Pastes. Cereal Chemistry 11:330-334. 1934.

EXPERIMENTAL RESULTS

The results obtained are tabulated and presented in the following order: Tables 1, 2, and 3, plot experiments by states; Tables 4 to 10, inclusive, nursery samples; Tables 11 and 12, single row yield trials; Table 13, special trial samples from Oregon; Table 14, commercial durum samples. Averages by state are presented wherever such values appear to be useful.

STATION PLOT EXPERIMENTS

Minnesota - (Table 1). The four varieties of Mindum, Langdon, Wells, and Lakota were submitted for testing as well as two varieties, CI 13423, and CI 13468. The Morris, Minnesota, samples were the poorest of the two stations, having the lowest kernelweight, the lowest 1000 kernelweight, and the smallest average kernel size and poorest color. The two CI varieties had the poorest color of the series from Morris, but the best color of the series from Crookston. The average of these two varieties compared with the other varieties commercially available would not exclude them from the acceptable category from these tests. Additional samples would have to be evaluated to determine the exact quality of these two samples. Lakota had the smallest average kernel size which was also reflected in the yield of semolina.

South Dakota - (Table 2). The varieties of Ramsey, Wells, Lakota, LD 408, Sentry, and Yuma were received from Brookings; while Langdon, Lakota, Wells, and Ramsey were received from Highmore. These samples generally had low test weight and low average kernel size, with high protein, indicating the severity of damage due to scab this year in the area. The average semolina yield was considerably lower than that for the samples grown in Minnesota. Also, the average color value was down.

North Dakota - (Table 3). The five varieties of Mindum, Ramsey, Langdon, Wells, and Lakota were tested from 7 stations and two stations were represented by dryland and irrigated samples. These samples were much better than the Minnesota or South Dakota samples. No sizings were made on the wheats from these stations, however the 1000 kernel weight was higher than the other two states as well as test weight. The average color also was better for these samples. In comparing the dryland and irrigated samples, the dryland samples had higher test weight and produced a better color in the macaroni on an average than did the irrigated samples. All of the samples tested from North Dakota had from satisfactory to excellent color scores.

NEW VARIETIES GROWN IN STATION NURSERIES

In Tables 4 through 9 are tabulated the results on new varieties grown in station nurseries. Standard name varieties of known quality were also grown for checks. The Brookings, South Dakota, and the Morris, Minnesota samples were badly damaged and were therefore not processed.

Minnesota - (Table 4). The varieties Sel. No. 58-25 and R. L. 3394 produced macaroni with slightly lower than satisfactory color score, but equal to Mindum. CI 13758 gave the poorest color score and, on the basis of these results only, should be discarded.

South Dakota - (Table 5). All samples gave satisfactory color score, except Sel. No. 59-61 which was unsatisfactory.

North Dakota - (Table 6). The samples submitted from Langdon were much poorer in color than the samples from Minot. Sel.No. 59-61 gave the poorest color score in the Langdon series and was poorest along with Sel.No. 58-321 and R.L.3394 in the Minot series. Sel.No. 59-61 would be rated as unsatisfactory.

SECONDARY DURUM

North Dakota - (Table 7). All color scores are approximately one unit lower than the satisfactory rating of 8. However, when compared to acceptable varieties grown under comparable conditions, they would have to be rated as satisfactory. Test weights of these samples averaged lower.

ADVANCED DURUM

North Dakota - (Table 8). The standard varieties had poorer than satisfactory color scores in the macaroni. Most of the selections had better color scores than the standard varieties, and were rated as satisfactory or better. Sel.No. 59-30 gave the poorest color of the series, and would have to be rated as unsatisfactory when compared to the other selections. Sel.No. 60-25 and Sel.No. 60-101 would have to be rated as questionable on the basis of these results.

SEMI-DWARF DURUM

Washington - (Table 9). These samples were compared with a blend of standard varieties with a slick color score of 10. The Sel.No. varieties of 59-121, 59-131, 60-10, 60-82, 6-228, 6-231, 6-232, 6-244, and 6-246 were satisfactory. The Sel.No. varieties 60-41, 60-84, 60-114, 60-115, 60-124,

6-177, 57-1, and 57-179 were questionable. Sel.No. varieties 60-30, 60-89, 56-49, 56-70, and 58-75 are two points under in color score, but should be tested again. The remainder of the samples are unsatisfactory based on slick color score.

DWARF DURUM

North Dakota - (Table 10). The color scores of these samples were below satisfactory including the check. However, the basic faults of these samples were the kernel characteristics, (poor test weight, and 1000 kernelweight).

SINGLE ROW YIELD TRIALS

Mexican Series - (Table 11). Sel.No. varieties of 61-105 and 61-106 gave unsatisfactory color. Sel.No. 61-130 gave a questionable score.

North Dakota Series - (Table 12). Sel.No. 61-45 gave an unsatisfactory color. Sel.No. varieties 61-53, 61-54, 61-57, 61-64, 61-67, 61-68, 61-80, 61-17, 61-18, 61-30, and 61-69 gave questionable color scores.

SPECIAL TEST

Oregon - (Table 13). The data given in this study was for the Sentry variety grown on 17 farms in the Klamath Falls area. The purpose of the study was to determine the adaptability and quality of the variety for this area. Seven of the samples were rated as questionable for color score; ten were rated as satisfactory or better for color. All samples had very high test weights.

COMMERCIAL SAMPLES

Duluth - (Table 14). Eight samples of commercially grown and marketed durum wheat were obtained through the Grain Division, Agricultural Marketing Service. These represented 71 carlots of wheat. All samples would be rated as satisfactory.

TABLE 1

1962 Crop Quality Data of Durum Wheat Varieties

Grown in Minnesota Plots

Variety	T.W.1/ Appear.1/	Kernel %	1000 Kwt.	Wht. Pro.2/	% Lg.K.	% Med.K.	% Sm.K.	% Semo.3/	Ash2/ 10 Sq.In.	Specks/ 10	% Abs.2/	Visual Color4/	Mixogram Rate5/Abs2/		
Morris															
Mindum	61.1	3 HAD	85	31.5	11.6	28	69	3	57.9	.69	27	28.1	7.5	5	26.9
Langdon	60.0	4 HAD	80	31.3	12.0	20	76	4	57.6	.67	17	28.1	9	3	26.3
Wells	58.4	5 HAD	80	24.8	13.8	13	82	5	58.8	.76	33	27.5	8B	2	27.5
Lakota	54.0	5 HAD	80	24.8	14.1	10	81	9	55.5	.81	40	28.4	7B	5	29.0
CI 13423	55.7	5 HAD	80	28.0	13.9	19	76	5	57.7	.77	27	28.6	6.5B	4	28.6
CI 13468	54.6	5 HAD	80	24.8	14.2	12	81	7	57.5	.81	33	28.7	6.5B	4	28.6
Crookston															
Mindum	64.5	3 HAD	85	44.0	10.8	68	31	1	60.2	.64	30	29.6	8.5	6	26.5
Langdon	62.9	1 HAD	85	43.6	11.3	62	36	2	59.9	.69	37	28.2	9	4	26.5
Wells	63.0	1 HAD	75	34.4	11.1	42.4	54	3.6	59.1	.69	40	28.9	9.5	5	26.8
Lakota	62.0	1 AD	65	35.4	10.9	45	52	3	57.1	.68	27	30.9	10	7	27.9
CI 13423	62.5	1 HAD	75	41.6	11.4	69	30	1	61.1	.67	30	31.2	10	7	28.4
CI 13468	62.7	1 HAD	80	40.8	11.2	63	36	1	59.6	.63	40	30.5	10	6	27.6
Average, 2 Stations															
Mindum	62.80		85.0	37.75	11.20	48.0	50.0	2.0	59.05	.665	28.5	28.85	8.00	5.5	26.70
Langdon	61.45		82.5	37.45	11.65	41.0	56.0	3.0	58.75	.680	27.0	28.15	9.00	3.5	26.40
Wells	60.70		77.5	29.60	12.45	27.7	68.0	4.3	58.95	.725	36.5	28.20	8.75	3.5	27.15
Lakota	58.00		72.5	30.10	12.50	27.5	66.5	6.0	56.30	.745	33.5	29.65	8.50	6.0	28.45
CI 13423	59.10		77.5	34.80	12.65	44.0	53.0	3.0	59.40	.720	28.5	29.90	8.25	5.5	28.50
CI 13468	58.65		80.0	32.80	12.70	37.5	58.5	4.0	58.55	.720	36.5	29.60	8.25	5.0	28.10

1/ Unofficial

2/ 14% Moisture Basis

3/ Purified Semolina

4/ B= Brown, R/B = Red/Brown, Standard Color Score is 8

5/ Refer to Reference Mixograms for Numerical Curve Pattern

TABLE 2

1962 Crop Quality Data of Durum Wheat Varieties

Grown in South Dakota Plots

Variety	T.W. <u>1</u> / Appear. <u>1</u>	Kernel % V.K.	1000 Kwt.	Wht. Pro. <u>2</u>	% Lg.K.	% Md.K.	% Sm.K.	Semo. <u>3</u>	Ash <u>2</u>	Specks/ 10Sq.In.	% Abs. <u>2</u>	Visual Color <u>4</u>	Mixo. Rate <u>5</u>	Mixo. Abs. <u>2</u>
<u>Brookings</u>														
Ramsey	57.1	5 HAD	75	24.6	13.8	13	77	10	57.3	.83	30	28.8	7B	27.6
Wells	56.4	5 HAD	75	25.0	14.4	8	83	9	53.5	.83	23	28.0	6.5B	28.2
Lakota	53.6	5 HAD	75	24.1	14.8	11	79	10	53.7	.83	20	29.6	6.5B	29.3
LD 408	56.2	3 HAD	80	24.0	13.1	2	86	12	54.4	.72	23	28.1	9	26.9
Sentry	59.5	4 HAD	80	30.3	14.4	15	77	8	57.2	.73	33	28.1	8.5	27.9
Yuma	55.0	SGHAD	75	23.8	15.3	9	78	13	51.3	.81	27	28.6	5.5R/B	29.3
<u>Highmore</u>														
Langdon	55.9	4 HAD	80	27.2	14.9	20	72	7	58.3	.81	37	27.5	9	28.4
Lakota	53.6	5 HAD	80	26.0	15.2	12	78	10	52.7	.89	43	27.5	9	30.0
Wells	55.8	4 HAD	80	23.9	15.3	15	75	10	53.7	.85	37	27.5	9.5	29.1
Ramsey	53.0	5 HAD	80	21.4	16.5	11	73	16	52.5	1.06	27	27.3	7B	29.9
<u>Average, 2 Stations</u>														
Ramsey	55.1		78	23.0	15.2	12.0	75.0	13	54.9	.945	28.5	28.1	7B	28.75
Wells	56.1		78	24.5	14.9	11.5	79.0	9.5	53.5	.840	30.0	27.75	7.5	28.65
Lakota	53.6		78	25.1	15.0	11.5	78.5	10	53.2	.860	31.5	28.55	7.5	29.65

1/ Unofficial2/ 14% Moisture Basis3/ Purified Semolina4/ B = Brown, R/B = Red/Brown, Standard Color Score is 85/ Refer to Reference Mixograms for Numerical Curve Pattern

TABLE 3
1962 Crop Quality Data of Durum Wheat Varieties
Grown in North Dakota Plots

Variety	T.W.1/	Grade1/	% Vitreous Kernel 6/	1000 Kwt.	Wheat Protein 2/	Semolina Yield 3/	Ash 2/	Specks / 10 Sq. In.	% Abs. 2/	Visual Color 4/	Farinograph Pattern 5/
<u>Langdon</u>											
Mindum	62.9	1 HAD	90	38.2	12.4	55.0	.58	30	29.9	9.0	6
Ramsey	63.1	1 HAD	90	36.5	13.4	55.7	.61	37	29.3	9.0	5
Langdon	62.3	1 HAD	90	41.5	13.4	57.4	.56	20	29.3	9.5	4
Wells	62.5	1 HAD	90	34.8	13.9	53.8	.57	20	29.8	9.0	3
Lakota	60.2	1 HAD	90	33.8	14.0	56.0	.59	17	30.4	9.5	6
<u>Fargo</u>											
Mindum	61.1	1 HAD	85	34.2	13.2	55.2	.73	30	28.5	9.5	6
Ramsey	60.0	1 HAD	85 TB	30.5	13.4	54.6	.74	20	28.4	8.0	4
Langdon	60.0	1 HAD	85	35.6	12.3	56.4	.71	23	27.8	8.0	3
Wells	57.6	3 HAD	80 TB	29.1	13.9	53.5	.75	30	28.3	8.0	4
Lakota	54.2	4 HAD	80 TB	27.2	14.5	50.9	.83	37	29.0	9.5	7
<u>Menden</u>											
Mindum	64.2	1 HAD	95	41.5	14.1	58.9	.59	13	27.8	9.0	3
Ramsey	63.7	1 HAD	95	35.3	13.5	55.5	.58	17	28.3	9.0	3
Langdon	63.7	1 HAD	95	40.0	14.5	56.9	.59	20	28.3	9.0	3
Wells	64.5	1 HAD	95	36.4	14.1	51.8	.55	23	28.5	9.0	3
Lakota	63.1	1 HAD	95 TB	37.3	14.3	52.2	.57	30	30.4	10.0	5
<u>Dickinson</u>											
Mindum	61.4	1 HAD	80	29.8	13.9	57.4	.73	17	29.1	8.0	5
Ramsey	61.2	1 HAD	80 TE	34.7	14.6	55.1	.72	17	27.1	8.0	3
Langdon	60.0	1 HAD	80 TE	34.2	15.2	53.0	.72	23	27.7	8.0	4
Wells	60.1	1 HAD	75 TE	29.6	15.6	55.4	.75	27	28.2	9.0	3
Lakota	58.2	2 HAD	75 TE	28.2	15.2	55.5	.63	33	28.1	9.0	6
<u>Williston - Dryland</u>											
Mindum	65.4	1 HAD	90 TP	45.0	14.2	58.4	.62	20	28.1	9.0	5
Ramsey	66.8	1 HAD	90 TP	45.4	14.0	56.9	.57	27	28.0	9.0	5
Langdon	66.3	1 HAD	90 TP	43.5	14.4	59.8	.62	17	28.2	9.0	4
Wells	65.7	1 HAD	90 TP	36.1	13.2	57.0	.57	23	28.1	9.0	3
Lakota	64.2	1 HAD	90 TP	36.1	13.4	59.2	.56	30	28.1	9.5	6
<u>Williston - Irrigated</u>											
Mindum	64.8	1 HAD	95	41.0	12.9	56.1	.55	17	28.0	9.0	5
Ramsey	65.0	1 HAD	95	41.7	13.0	48.6	.60	13	28.1	8.5	5
Langdon	64.7	1 HAD	90	44.6	13.1	58.9	.59	20	28.6	9.0	5
Wells	63.8	1 HAD	95	34.6	13.1	56.4	.64	17	27.6	8.0	3
Lakota	62.0	1 HAD	95	35.7	13.3	59.4	.63	17	28.1	8.0	5
<u>Minot</u>											
Mindum	64.7	1 HAD	80	38.2	10.8	57.5	.65	17	28.3	8.0	6
Ramsey	65.1	1 HAD	90	39.1	11.3	60.2	.67	13	27.6	8.0	6
Langdon	63.8	1 HAD	90	41.5	11.7	58.4	.62	10	27.5	9.5	4
Lakota	59.2	2 HAD	90	31.6	12.4	51.7	.68	10	27.9	10.0	6
Wells	61.7	1 HAD	90	31.8	12.8	55.4	.68	13	28.0	10.0	3
<u>Carrington - Dryland</u>											
Mindum	60.0	1 HAD	90	33.9	13.8	50.7	.62	20	27.7	9.5	5
Ramsey	60.2	1 HAD	90	32.4	14.4	54.4	.70	20	27.6	9.5	5
Langdon	60.4	1 HAD	90	36.6	13.6	50.5	.64	23	27.3	9.5	5
Wells	60.0	1 HAD	90	30.8	14.6	46.1	.70	17	27.8	9.5	4
Lakota	57.4	3 HAD	90	29.2	14.7	54.4	.67	17	28.9	10.0	7
<u>Carrington - Irrigated</u>											
Mindum	61.6	1 HAD	90	35.0	14.1	53.7	.71	27	27.1	8.0	5
Ramsey	61.1	1 HAD	90	34.7	13.4	48.2	.72	23	27.1	9.0	5
Langdon	61.5	1 AD	60	41.0	12.4	57.2	.64	23	26.9	8.5	3
Wells	61.5	1 AD	60	37.2	12.4	53.0	.63	13	27.1	9.0	3
Lakota	58.7	2 D	40	35.2	12.1	52.5	.67	17	28.6	9.0	7
<u>Edgeley</u>											
Mindum	61.8	1 AD	60	40.0	12.4	55.2	.63	43	29.1	8.0	6
Ramsey	61.6	1 HAD	80	36.8	12.7	59.2	.67	23	26.9	8.0	4
Langdon	60.0	1 AD	60 BL	38.6	12.3	57.0	.62	37	28.6	9.5	4
Wells	60.0	1 D	30	34.1	13.8	50.9	.61	30	29.4	9.5	3
Lakota	57.3	3 D	30	34.8	13.9	61.0	.65	27	28.1	9.5	6
<u>Average for 10 Stations</u>											
Mindum	62.7	1	85	37.6	13.1	55.8	.64	23	28.3	8.7	5
Ramsey	62.7	1	89	36.7	13.3	54.8	.65	21	27.8	8.6	4
Langdon	62.2	1	83	39.7	13.2	56.5	.63	22	28.0	8.9	4
Wells	61.7	1	80	33.4	13.7	53.3	.64	21	28.2	9.0	3
Lakota	59.4	3	78	32.9	13.7	55.2	.64	24	28.7	9.4	6

1/ Unofficial
2/ 14% Moisture Basis
3/ Purified Semolina
4/ B = Brown, R/B = Red/Brown, Standard Color Score is 8
5/ Refer to Reference Farinographs for Numerical Curve Pattern
6/ TP = Trace of Pink Kernels, TE = Trace of Ergot Kernels, TB = Trace of Black Point, BL = Bleached or Pale Kernels

TABLE 4

1962 Crop Quality Data of Durum Wheat Varieties

Grown in Minnesota Nurseries
Crookston, Minnesota

Variety	C.I. No.	Kernel T.W.1/ Appear.3/ Kwt. Pro.2/	1000 Wht. Pro.2/	% Lg.K. Med.K.	% Sm.K.	% Sem.4/	Specks/ 10Sq.In.	% Abs.2/	Visual Mixogram Color5/ Pattern 6/				
Mindum	5296	63.5	A	44	2	57.2	20	35.0	7.5	7			
Langdon	13165	63.5	A	38	2	55.8	27	34.7	8.5	6			
Ramsey	13246	63.5	A	38	1	50.0	23	35.3	8.5	6			
Wells	13333	64.0	A	55	3	47.5	30	35.3	8.5	6			
Lakota	13335	62.5	A	49	4	53.4	37	35.7	8.5	7			
Sel.No. 56-1	13423	62.0	A	32	1	62.2	27	35.7	8.5	8			
Sel.No. 56-17	13468	61.5	A	36	1	64.9	43	36.3	8.5	7			
Sel.No. 58-25	13581	62.5	A	35	1	63.0	30	36.0	7.5	7			
R.L. 3394	13583	62.5	AB	29	0	61.3	30	35.7	7.5	6			
	13752	63.5	A	39	1	54.5	30	35.3	8.5	-			
	13753	64.5	A	59	4	52.7	33	34.3	9.0	5			
	13754	64.0	A	44	2	60.9	33	34.7	8.5	7			
	13755	64.0	A	47	3	50.7	53	34.7	8.0	6			
	13756	63.5	A	49	3	51.1	40	34.0	8.5	7			
	13757	63.0	A	32	0	51.0	30	34.7	8.5	7			
	13758	64.0	H	24	0	50.3	40	34.3	6.5B	6			
<u>Averages</u>													
	63.25			40.95	13.55	57.56	40.68	1.75	55.4	32.8	35.1	8.18	6.1

1/ Unofficial

2/ 14% Moisture Basis

3/ A= Excellent, H= Fairly Good, D= Poor, B= Blackpoint, G= Green

4/ Purified

5/ Standard Color Score is 8

6/ Refer to Reference Mixogram for Numerical Curve Pattern

TABLE 5

1962 Crop Quality Data of Durum Wheat Varieties

Grown in South Dakota Nurseries

Blend of Eureka and Watertown, South Dakota

Variety	T.W.1/ Appear.3/	Kernel 1000 Kwt.	Wht. Pro.2/	% Lg.K.	% Med.K.	% Sm.K.	% Sem.4/	Specks/ 10sq.in.	% Abs.2/	Visual Color 5/	Mixo. Pattern6/	
Mindum	60.3	H	33.3	12.7	13	78	9	58.0	23	34.3	8.5	6
Langdon	61.7	HB	36.5	12.5	46	51	3	59.2	27	34.0	8.5	6
Ramsey	58.9	D	29.7	14.0	7	74	19	57.9	47	34.0	8.0	6
Wells	59.5	HB	28.6	13.5	20	74	6	56.6	43	34.0	8.0	6
Lakota	56.5	HB	29.1	13.4	15	74	11	57.1	23	34.7	8.0	7
Sel.No. 56-1	58.0	H	27.1	13.8	19	74	7	57.5	30	34.7	9.0	7
Sel.No. 56-17	59.0	H	32.1	13.8	19	73	8	56.1	30	34.7	8.5	7
Sel.No. 58-25	58.0	H	32.7	13.7	19	73	8	60.0	30	35.0	8.0	7
Sel.No. 58-274	59.8	D	33.3	13.7	24	69	7	57.8	30	35.0	8.0	7
Sel.No. 58-312	60.0	H	30.6	13.0	14	77	9	58.3	33	34.3	9.0	6
Sel.No. 11-315	60.0	H	32.8	12.5	27	66	8	59.0	27	34.7	8.5	5
Sel.No. 11-321	59.5	H	30.7	12.9	18	71	11	55.7	27	34.3	8.0	5
Sel.No. 11-324	60.8	H	34.3	12.8	28	65	7	56.8	30	34.3	8.5	4
Sel.No. 59-88	59.3	H	36.0	13.4	32	63	5	55.7	37	34.0	8.5	6
Sel.No. 59-61	57.5	H	33.2	13.6	33	62	5	56.7	27	35.3	6.5B	8
R.L. 3394	58.7	HB	31.3	14.0	13	77	10	56.6	23	34.3	8.5	6
<u>Averages</u>												
	59.21		31.95	13.33	21.68	70.0	8.3	57.43	30.4	34.47	8.25	6.1

1/ Unofficial

2/ 14% Moisture Basis

3/ A= Excellent, H= Fairly Good, D= Poor, B= Blackpoint, G= Green

4/ Purified

5/ Standard Color Score is 8

6/ Refer to Reference Mixogram for Numerical Curve Pattern

TABLE 6

Quality Data of Durum Wheat Varieties Grown in North Dakota Uniform Trial Nurseries

1962 Crop

Variety	T.W. <u>1</u> /	Kernel Appear. <u>3</u> /	1000 Kwt.	Wht. Pro. <u>2</u> /	% Semo. <u>4</u> /	Specks / 10 Sq.In.	% Abs. <u>2</u> /	Color <u>5</u> /	Mixogram Pattern <u>6</u> /
<u>Langdon, North Dakota</u>									
Mindum	57.3	1	30.5	12.8	58.8	63	35.3	6.0	7
Langdon	61.0	3	39.2	12.1	61.7	47	34.7	7.0	4
Ramsey	61.0	3	37.9	13.0	64.7	53	34.7	6.0 R	6
Wells	60.5	3	30.5	13.2	61.3	43	34.7	6.5 R	5
Lakota	58.6	3	32.2	13.3	61.4	40	35.0	7.0	7
56-1	59.9	3	37.6	13.1	61.5	53	34.0	7.0	7
56-17	60.3	3	33.8	13.1	65.7	57	34.7	6.5 R	7
58-25	59.3	3	34.8	13.6	64.9	47	34.7	6.5 R	7
58-274	61.3	3	33.6	13.6	63.6	43	34.7	6.5 R	6
58-312	60.8	3	35.7	13.1	62.8	47	34.3	7.0	6
58-315	60.4	3	35.7	12.7	65.4	57	34.3	6.5 R	6
58-321	61.0	3	33.7	12.1	62.5	60	34.0	6.5 R	5
58-324	60.8	3	38.5	13.0	62.6	50	34.7	7.0	6
59-88	61.4	3	42.6	13.4	61.6	53	34.7	7.0	7
59-61	59.8	3	36.2	13.1	65.7	43	35.3	5.0 R/B	7
RL 3394	62.3	3	39.1	12.8	64.8	47	34.3	6.5 R	6
<u>Minot, North Dakota</u>									
Mindum	64.1	4	40.2	13.3	64.8	30	34.3	8.0	6
Langdon	63.3	4	41.7	13.1	62.7	23	33.7	9.0	4
Ramsey	64.5	4	38.3	13.1	65.9	23	33.7	8.0	6
Wells	62.6	4	33.3	13.0	63.8	27	33.7	7.5	5
Lakota	60.3	4	30.9	13.4	61.7	30	34.3	8.0	6
56-1	62.9	4	37.7	13.1	64.0	27	34.0	8.0	6
56-17	62.8	3	35.7	13.6	64.0	20	34.0	8.0	6
58-25	63.0	3	40.2	14.0	64.2	23	35.0	7.5	7
58-274	63.8	3	36.8	14.7	62.6	20	34.7	7.0	6
58-312	62.3	3	34.6	13.6	66.7	30	34.3	7.0	6
58-315	63.1	3	34.4	13.3	64.2	30	34.0	8.0	5
58-321	62.8	3	34.7	13.0	64.0	17	34.0	6.0 R	6
58-324	63.6	3	36.1	13.5	57.0	27	34.0	8.0	5
59-88	63.1	3	37.3	14.3	57.5	27	33.7	7.0	5
59-61	62.5	3	34.6	13.2	59.5	27	36.3	6.0 R	7
RL-3394	63.4	4	38.2	13.7	59.3	20	36.0	6.0 R	7

1/ Unofficial2/ 14% Moisture Basis3/ 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good4/ Purified5/ Standard Color Score is 8, R = Red, R/B = Red/Brown

TABLE 7

Quality Data of Durum Wheat Varieties Grown in North Dakota Secondary Durum Nurseries

1962 Crop

Variety	T.W. <u>1</u> /	Kernel Appear. <u>3</u> /	1000 Kwt.	Wht. Pro. <u>2</u> /	% Semo. <u>4</u> /	Specks / 10 Sq.In.	% Abs. <u>2</u> /	Color <u>5</u> /	Mixogram Pattern <u>6</u> /
<u>Fargo and Langdon, North Dakota</u>									
Langdon	58.0	3	38.5	12.1	62.4	27	35.0	7.0	8
Ramsey	58.4	3	34.6	13.0	63.8	20	35.7	6.0 R	8
Wells	57.8	3	30.0	13.9	60.6	23	35.3	7.5	6
Lakota	54.7	3	31.4	13.1	60.4	43	36.0	7.5	7
60-30	56.2	3	35.5	13.6	60.5	30	35.3	8.0	6
60-32	57.7	3	34.7	13.3	63.0	40	36.0	7.0	7
60-62	57.0	3	36.5	13.2	61.4	23	35.3	7.0	6
60-67	60.3	3	39.5	13.3	62.2	37	35.7	7.0	5
60-69	59.0	3	35.0	12.4	63.1	27	34.7	7.5	5
60-77	55.8	3	36.2	12.4	60.5	30	35.7	7.5	5
60-79	55.3	3	32.6	13.1	60.8	30	34.3	8.5	5
60-86	57.6	3	30.2	12.5	60.5	33	34.3	7.0	5
60-95	57.8	3	34.5	13.6	62.6	37	34.7	7.0	6
60-98	56.1	3	28.6	13.6	59.4	37	35.3	7.0	7
60-114	59.3	3	36.5	13.9	60.4	30	35.0	7.0	7
60-116	58.6	3	35.7	13.2	60.0	30	35.3	7.5	7
60-120	59.6	3	38.3	12.2	60.0	23	35.7	7.0	7

1/ Unofficial2/ 14% Moisture Basis3/ 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good4/ Purified5/ Standard Color Score is 8, R = Red, R/B = Red/Brown

TABLE 8

Quality Data of Durum Wheat Varieties Grown in North Dakota Advanced Durum Nurseries

1962 Crop

Variety	T.W. <u>1</u> /	Kernel Appear. <u>3</u> /	1000 Kwt.	Wht. Pro. <u>2</u> /	% Semo. <u>4</u> /	Specks / 10 Sq.In.	% Abs. <u>2</u> /	Color <u>5</u> /	Mixogram Pattern <u>6</u> /
<u>Fargo and Langdon, North Dakota</u>									
Langdon	57.9	3	37.9	13.2	54.9	47	35.0	6.5 R	6
Wells	59.0	1	32.2	12.5	56.9	37	35.0	6.5 R	6
Lakota	55.3	1	30.8	13.5	48.8	33	35.3	6.5 R	7
58-75	58.2	3	34.5	13.9	47.4	33	35.0	8.5	7
58-303	58.8	3	35.2	12.5	56.1	37	35.3	8.0	6
59-30	59.5	3	33.9	13.1	53.1	30	37.0	6.0	7
59-39	60.2	3	40.2	13.5	55.1	30	35.0	8.0	6
60-25	57.6	3	34.0	13.0	64.1	40	35.0	6.5 R	6
60-84	59.0	3	33.6	12.5	59.9	23	35.0	8.0	6
60-74	59.1	3	39.2	13.4	61.8	37	34.0	8.5	5
60-90	59.1	3	31.6	12.4	57.1	27	34.3	8.0	5
60-101	58.1	3	35.7	13.3	59.5	30	37.0	7.0	8
60-115	60.7	3	37.9	12.5	62.0	33	34.3	8.5	6

1/ Unofficial2/ 14% Moisture Basis3/ 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good4/ Purified5/ Standard Color Score is 8, R = Red, R/B = Red/Brown

TABLE 7

Quality Data of Durum Wheat Varieties Grown in North Dakota Secondary Durum Nurseries

1962 Crop

Variety	T.W. <u>1</u> /	Kernel Appear. <u>3</u> /	1000 Kwt.	Wht. Pro. <u>2</u> /	% Semo. <u>4</u> /	Specks / 10 Sq.In.	% Abs. <u>2</u> /	Color <u>5</u> /	Mixogram Pattern <u>6</u> /
<u>Fargo and Langdon, North Dakota</u>									
Langdon	58.0	3	38.5	12.1	62.4	27	35.0	7.0	8
Ramsey	58.4	3	34.6	13.0	63.8	20	35.7	6.0 R	8
Wells	57.8	3	30.0	13.9	60.6	23	35.3	7.5	6
Lakota	54.7	3	31.4	13.1	60.4	43	36.0	7.5	7
60-30	56.2	3	35.5	13.6	60.5	30	35.3	8.0	6
60-32	57.7	3	34.7	13.3	63.0	40	36.0	7.0	7
60-62	57.0	3	36.5	13.2	61.4	23	35.3	7.0	6
60-67	60.3	3	39.5	13.3	62.2	37	35.7	7.0	5
60-69	59.0	3	35.0	12.4	63.1	27	34.7	7.5	5
60-77	55.8	3	36.2	12.4	60.5	30	35.7	7.5	5
60-79	55.3	3	32.6	13.1	60.8	30	34.3	8.5	5
60-86	57.6	3	30.2	12.5	60.5	33	34.3	7.0	5
60-95	57.8	3	34.5	13.6	62.6	37	34.7	7.0	6
60-98	56.1	3	28.6	13.6	59.4	37	35.3	7.0	7
60-114	59.3	3	36.5	13.9	60.4	30	35.0	7.0	7
60-116	58.6	3	35.7	13.2	60.0	30	35.3	7.5	7
60-120	59.6	3	38.3	12.2	60.0	23	35.7	7.0	7

1/ Unofficial2/ 14% Moisture Basis3/ 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good4/ Purified5/ Standard Color Score is 8, R = Red, R/B = Red/Brown

TABLE 8

Quality Data of Durum Wheat Varieties Grown in North Dakota Advanced Durum Nurseries

1962 Crop

Variety	T.W. <u>1</u> /	Kernel Appear. <u>3</u> /	1000 Kwt.	Wht. Pro. <u>2</u> /	% Semo. <u>4</u> /	Specks / 10 Sq.In.	% Abs. <u>2</u> /	Color <u>5</u> /	Mixogram Pattern <u>6</u> /
<u>Fargo and Langdon, North Dakota</u>									
Langdon	57.9	3	37.9	13.2	54.9	47	35.0	6.5 R	6
Wells	59.0	1	32.2	12.5	56.9	37	35.0	6.5 R	6
Lakota	55.3	1	30.8	13.5	48.8	33	35.3	6.5 R	7
58-75	58.2	3	34.5	13.9	47.4	33	35.0	8.5	7
58-303	58.8	3	35.2	12.5	56.1	37	35.3	8.0	6
59-30	59.5	3	33.9	13.1	53.1	30	37.0	6.0	7
59-39	60.2	3	40.2	13.5	55.1	30	35.0	8.0	6
60-25	57.6	3	34.0	13.0	64.1	40	35.0	6.5 R	6
60-84	59.0	3	33.6	12.5	59.9	23	35.0	8.0	6
60-74	59.1	3	39.2	13.4	61.8	37	34.0	8.5	5
60-90	59.1	3	31.6	12.4	57.1	27	34.3	8.0	5
60-101	58.1	3	35.7	13.3	59.5	30	37.0	7.0	8
60-115	60.7	3	37.9	12.5	62.0	33	34.3	8.5	6

1/ Unofficial2/ 14% Moisture Basis3/ 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good4/ Purified5/ Standard Color Score is 8, R = Red, R/B = Red/Brown

TABLE 9

1962 Crop Quality Data of Durum Wheat Varieties

Grown in Washington Nurseries

Prosser, Washington

Variety or Sel. No.	T.W. ^{1/}	1000 Kwt.	Wht. Pro. ^{2/}	% Lg.K.	% Med.K.	% Sm.K.	% Semo. ^{3/}	Ash ^{2/}	Dust Color	Slick Color ^{4/}	Carotene p.p.m. ^{2/}	Lipoxidase ul/m/g ^{2/}
59-46	62.0	40.5	11.5	62.0	36.0	2.0	35.6	.775	8	7	5.0	15
59-56	65.6	42.9	12.8	71.0	29.0	0.0	32.2	.770	9	6	4.7	19
59-57	64.8	44.1	12.6	76.0	24.0	0.0	32.2	.735	9	6	5.8	16
59-62	67.2	42.0	13.0	76.0	24.0	0.0	31.7	.725	9	6	4.5	19
59-104	64.0	43.7	13.5	73.0	27.0	0.0	31.3	.725	8	7	5.9	20
59-121	58.4	29.5	13.6	16.0	75.0	9.0	34.0	.740	11	12	6.5	15
59-131	65.6	32.9	12.5	52.0	44.0	4.0	35.1	.720	10	11	7.4	14
60-10	64.0	47.2	13.5	78.0	22.0	0.0	35.0	.655	11	10	5.2	20
60-25	60.4	42.6	11.9	73.0	26.0	1.0	34.4	.790	8	7	4.9	14
60-26	64.8	40.3	12.1	67.0	31.0	2.0	33.2	.700	10	7	4.6	15
60-29	62.4	43.1	12.4	76.0	22.0	2.0	32.9	.720	9	7	4.9	19
60-30	64.4	42.9	12.7	77.0	21.0	2.0	32.9	.655	9	8	4.6	20
60-41	62.4	38.8	12.9	66.0	32.0	2.0	31.2	.765	8	9	5.2	17
60-50	63.6	44.1	13.1	75.0	24.0	1.0	31.0	.740	9	7B	4.6	16
60-52	62.4	49.3	12.7	90.0	10.0	0.0	34.3	.665	9	7B	6.9	17
60-82	62.4	38.5	10.8	64.0	34.0	2.0	33.3	.765	10	10	8	14
60-87	64.4	48.3	12.6	73.0	26.0	1.0	34.3	.920	6	4G	4.3	14
60-89	63.2	49.0	13.6	85.0	15.0	0.0	33.8	.775	9	8	6.1	14
60-84	63.2	37.7	11.7	52.0	44.0	4.0	34.0	.815	10	9	5.3	13
60-73	63.6	42.2	12.7	74.0	24.0	2.0	35.9	.850	9	4G	5.0	9
60-114	64.0	44.8	13.1	75.0	24.0	1.0	31.7	.765	10	9.5	5.9	17
60-115	62.0	46.5	13.1	78.0	21.0	1.0	31.1	.760	10	9.5	6.2	15
60-124	64.4	39.4	12.6	60.0	38.0	2.0	36.5	.710	10	9.5	6.3	15
60-143	61.2	30.2	11.3	12.0	79.0	9.0	32.4	.840	7	5G	4.0	28
60-146	57.2	32.2	13.1	66.0	33.0	1.0	33.2	.965	5	2B	3.8	28
60-160	64.4	41.5	11.9	50.0	49.0	1.0	29.7	.840	6	2W	4.7	27
60-161	64.0	42.6	12.2	49.0	50.0	1.0	29.4	.765	7	2W	2.8	30
60-168	64.0	43.7	11.3	48.0	52.0	0.0	30.9	.750	7	2W	3.0	32
60-177	56.0	34.0	14.4	52.0	46.0	2.0	9.2	-	5	1B	6.8	-
60-193	-	35.8	13.5	36.0	62.0	2.0	20.3	1.230	4	1B	5.2	30
60-200	61.2	39.1	12.2	26.0	73.0	1.0	27.7	.815	7	2W	4.9	24
60-201	62.0	38.8	12.9	22.0	76.0	2.0	27.0	.820	7	2W	4.4	27
60-203	62.4	45.5	13.3	57.0	42.0	1.0	28.2	.760	7	2W	4.0	24
60-206	60.0	48.8	10.8	64.0	36.0	0.0	30.4	.770	6	3W	4.4	21
60-208	64.4	48.8	13.1	65.0	35.0	0.0	30.8	.735	6	2W	3.1	25
60-223	65.2	44.2	11.8	71.0	28.0	1.0	29.3	.705	7	2W	3.2	27
60-224	65.6	43.7	11.1	56.0	43.0	1.0	29.6	.675	8	3W	4.7	29
60-226	62.4	46.9	10.9	66.0	34.0	0.0	30.0	.660	5	2W	2.6	27
6-26	63.6	50.3	12.7	86.0	14.0	0.0	29.7	.655	9	7	6.8	12
6-47	67.2	47.4	11.8	81.0	17.0	2.0	33.0	.730	8	2W	5.3	11
6-85	66.0	39.5	12.2	64.0	33.0	3.0	30.6	.745	11	7	5.6	5
6-104	67.2	48.1	10.5	82.0	17.0	1.0	31.7	.760	10	6	8.4	15
6-113	66.8	48.1	12.4	86.0	14.0	0.0	28.7	.715	11	5	5.2	15
6-133	65.2	52.9	13.1	89.0	11.0	0.0	27.5	.750	10	4B	5.4	16
6-159	65.2	47.6	12.9	78.0	21.0	1.0	29.3	.685	11	4B	5.0	16
6-163	66.0	43.7	11.5	75.0	23.0	2.0	30.8	.720	9	4B	4.8	16
6-168	65.6	45.9	11.8	76.0	23.0	1.0	29.3	.740	8	3B	4.9	15
6-177	65.2	50.8	13.1	83.0	17.0	0.0	29.9	.690	11	9	5.5	14
6-202	66.0	53.4	11.2	90.0	10.0	0.0	29.4	.670	8	7	4.5	16
6-228	62.0	45.5	11.4	77.0	20.0	3.0	33.6	.655	11	10	5.7	12
6-231	64.4	34.5	11.2	53.0	42.0	5.0	31.7	.760	12	12	5.4	10
6-232	62.0	39.8	11.3	60.0	37	3	33.7	.655	11	11	5.6	10
6-244	62.4	39.8	10.7	63.0	33.0	4.0	39.3	.715	11	11	5.8	16
6-246	65.6	39.4	11.1	70.0	26.0	4.0	38.8	.755	11	12	6.1	15
57-1	62.0	38.9	12.9	60.0	37.0	3.0	34.7	.765	9	9	5.4	13
56-49	62.4	46.1	12.8	83.0	16.0	1.0	34.3	.685	10	8	5.2	17
58-312	61.5	40.0	12.5	61.0	37.0	2.0	35.1	.725	8	6	7.2	13
57-179	62.0	44.4	13.5	76.0	23.0	1.0	33.9	.670	10	9	5.2	19
57-145	62.6	48.5	12.3	81.0	18.0	1.0	33.2	.705	9	6	4.8	16
56-14	62.0	46.7	12.3	73.0	26.0	1.0	32.7	.685	10	4B	7.0	18
Wells	62.3	40.7	13.1	73.0	25.0	2.0	32.5	.700	9	4B	5.0	14
Sentry	62.8	49.8	13.2	87.0	13.0	0.0	31.7	.715	9	4B	4.7	18
Lakota	61.6	43.9	12.6	76.0	22.0	2.0	31.3	.740	10	4B	5.0	17
57-8	61.3	41.2	12.8	62.0	35.0	4.0	32.6	.735	-	-	5.2	13
Langdon	62.9	49.5	13.1	86.0	14.0	0.0	32.6	.725	8	4	4.4	13
57-97	62.6	46.7	12.3	82.0	17.0	1.0	32.2	.690	8	4B	4.3	18
56-45	62.4	47.2	12.8	82.0	18.0	0.0	30.3	.710	10	5	5.1	16
58-253	61.0	39.2	13.3	64.0	33.0	3.0	31.0	.725	6	3B	4.5	19
56-70	60.8	45.9	13.2	74.0	25.0	1.0	29.5	.745	10	8	6.0	18
58-275	60.8	37.7	12.9	62.0	35.0	3.0	32.1	.760	8	3B	4.6	15
58-75	62.0	47.4	12.1	79.0	20.0	1.0	34.8	.670	10	8	5.2	12
58-108	62.7	45.2	12.9	72.0	27.0	1.0	31.4	.675	7	3B	4.4	15
57-101	61.8	44.6	12.7	72.0	27.0	1.0	30.8	.680	5	4B	5.5	16
LD 357	61.1	43.3	13.3	68.0	31.0	1.0	29.7	.735	10	4B	5.4	15
58-198	61.0	40.2	13.2	66.0	31.0	3.0	28.9	.745	9	4B	6.0	15

^{1/} Unofficial^{2/} 14% Moisture Basis^{3/} Unpurified Semolina^{4/} B= Brown, G= Gray, W= White. Below 9 color score not acceptable

TABLE 10

Quality Data of Durum Wheat Varieties Grown in North Dakota Dwarf Durum Nurseries

1962 Crop

Langdon, North Dakota

Variety	T.W. <u>1</u> /	Kernel Appear. <u>3</u> /	1000 Kwt.	Wht. Pro. <u>2</u> /	% Semo. <u>4</u> /	Specks / 10 Sq. In.	% Abs. <u>2</u> /	Color <u>5</u> /	Mixogram Pattern <u>6</u> /
Wells	61.5	3	34.0	13.3	60.3	33	35.0	7.0	5
60-141	57.2	3	29.6	12.5	61.1	40	35.0	6.0 R	7
60-143	57.0	3	26.0	11.7	60.9	30	34.3	7.5	6
60-161	55.5	3	27.0	12.1	60.7	30	35.3	6.0 R	7
60-162	56.0	3	28.4	12.3	62.5	33	35.0	6.0 R	8
60-167	57.5	3	32.0	12.7	59.5	27	34.7	7.0	5
60-168	56.8	3	35.2	12.5	59.6	27	34.7	7.5	6
60-169	57.3	3	30.9	12.6	58.5	33	34.7	7.0	7
60-200	57.3	3	28.1	12.1	58.1	37	35.3	7.0	7
60-201	57.0	3	28.4	12.5	58.2	40	35.3	7.0	7
60-203	58.0	3	29.2	12.4	60.0	40	35.0	6.0 R	7
60-206	57.0	3	31.4	12.0	61.1	37	35.0	7.0	7
60-223	57.0	3	28.6	12.1	60.0	40	35.3	6.0 R	7
60-224	58.3	3	29.0	11.9	57.7	43	35.3	6.0 R	7
60-225	56.5	3	29.0	13.0	57.4	37	35.3	7.0	8
60-227	57.0	3	28.5	12.3	61.6	47	35.7	7.0	7

1/ Unofficial2/ 14% Moisture Basis3/ 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good4/ Purified5/ Standard Color Score is 8, R = Red, R/B = Red/Brown

TABLE 11

1962 Crop Quality Data of Durum Wheat Varieties

Blend of Langdon and Fargo, North Dakota

Mexican Single Row Yield Trials

Variety	Sel.No.	T.W. <u>1</u> /	Kernel Appear <u>3</u> /	1000 Kwt.	Wht. Pro. <u>2</u> /	% Lg.K.	% Med.K.	% Sm.K.	% Sem. <u>4</u> /	Specks/ 10 Sq.In.	% Abs. <u>2</u> /	Visual Color <u>5</u> /	Mixogram Pattern <u>6</u> /
Langdon		57.8	A	39.4	12.9	44	54	2	59.1	30	34.0	8.0	5
Mindum		58.5	HG	30.0	11.6	13	77	10	57.8	43	34.3	8.0	8
Br 180xWells	61-48	57.8	H	38.0	13.1	45	53	2	56.2	40	34.7	8.0	8
Br 180xWells	61-49	58.2	H	34.8	13.4	38	59	3	56.1	30	33.7	8.0	6
Br 180xWells	61-50	56.0	H	32.5	13.8	28	77	5	55.2	23	34.3	8.5	8
LD408xLD371-ST	61-76	60.4	H	31.9	13.2	23	71	6	59.1	36	33.3	8.0	3
LD393xStewart	61-81	61.0	A	39.5	14.2	54	45	1	56.2	26	34.7	8.5	6
LD393xStewart	61-82	59.5	H	38.2	13.5	55	44	1	54.5	40	33.3	8.0	5
Wells		58.8	H	32.0	13.2	24	72	4	55.4	33	34.0	8.0	6
LD371-SentryxLangdon	61-87	59.8	HB	39.4	13.4	57	42	1	56.5	40	34.0	8.0	7
LD371-SentryxLangdon	61-88	60.2	HB	38.3	13.1	58	41	1	55.6	46	34.0	8.0	5
LD371-SentryxLangdon	61-89	58.6	HB	37.6	13.1	48	50	2	57.2	33	33.7	8.5	6
Lakota		56.8	H	31.6	12.9	29	65	6	55.5	30	34.3	8.5	8
Lakota x Langdon	61-92	57.7	H	32.8	13.0	18	76	6	54.9	30	33.7	9.0	6
Lakota x Langdon	61-93	59.8	H	33.8	13.4	33	63	4	55.8	30	34.0	9.0	7
Lakota x Mindum	61-94	59.3	A	39.5	13.6	63	36	1	55.3	23	33.7	9.0	6
Lakota x Mindum	61-95	58.3	H	39.4	13.6	58	41	1	56.9	26	33.7	8.0	7
Lakota x Mindum	61-96	58.0	H	39.4	13.8	54	44	2	59.7	30	34.0	8.5	6
LD393 x Carleton	61-98	57.6	H	28.6	13.2	10	78	12	53.9	26	32.7	8.0	8
LD393 x Carleton	61-99	59.3	H	30.3	13.2	26	68	6	55.8	30	33.0	8.0	7
Langdon		60.0	A	38.2	13.0	48	50	2	61.7	30	32.0	8.0	6
Carleton x LD393	61-103	58.0	H	34.1	12.9	35	61	4	58.3	30	32.7	8.0	6
LD384 x Wells	61-104	59.2	H	32.3	12.9	28	66	6	54.3	36	32.7	8.0	5
LD384 x Wells	61-105	58.5	H	34.1	12.8	26	69	5	56.4	33	33.0	6.5	4
Wells x LD390	61-106	59.8	H	40.6	13.6	55	45	0	58.6	40	33.3	6.5	6
Lakota x P.I.231356	61-109	58.4	H	34.5	13.9	48	50	2	56.9	36	34.7	8.0	6
Lakota x P.I.231356	61-110	57.9	H	33.9	13.8	46	52	2	57.0	40	35.0	8.0	7
Wells		58.8	H	31.9	13.4	31	65	4	57.5	36	33.7	8.0	6
Lakota x LD390	61-116	58.5	H	33.3	13.4	34	62	4	57.5	36	33.3	8.5	5
Wells x Br170	61-117	57.9	H	34.6	13.5	47	51	2	58.3	40	33.7	8.0	6
Br180 x Lakota	61-118	57.5	H	33.0	13.4	34	62	4	56.0	30	33.3	8.0	6
Lakota		56.1	H	32.0	13.5	28	67	5	55.6	33	33.3	8.5	7
Lakota x Langdon	61-120	57.4	H	29.8	13.0	18	73	9	56.7	33	33.0	8.0	5
Lakota x Langdon	61-121	56.5	H	25.4	13.4	22	69	9	56.0	33	33.0	8.5	5
P.I.231356 x LD393	61-122	57.5	H	36.1	13.9	49	49	2	58.3	40	33.7	8.0	6
LD221 x LD393	61-123	58.2	A	40.6	13.6	59	40	1	54.9	30	33.7	8.0	6
Carleton x LD393	61-124	55.0	H	32.0	12.8	50	48	2	59.5	40	32.3	8.0	5
L.K.(D.W.F.4-Langdon x Langdon)/ Langdon	61-130	55.8	H	30.6	13.0	20	70	10	55.3	30	33.3	7.5	6
LD384 x Wells	61-105A	59.4	A	38.0	12.1	44	54	2	58.2	20	33.3	8.0	5
Wells		58.5	H	33.1	13.2	33	63	4	56.8	30	33.7	8.0	6
LD384 x Wells		59.0	H	32.4	13.9	23	73	4	55.6	36	33.0	8.5	4
Langdon x LD384	61-105B	56.5	H	32.7	13.7	30	67	3	57.6	40	33.0	8.5	3
Wells		58.0	H	32.6	13.6	29	67	4	56.6	36	33.3	8.5	7
Wells			H	30.4	13.6	17	77	6	55.3	40	33.0	9.0	5

1/ Unofficial2/ 14% Moisture Basis3/ A= Excellent, H= Fairly Good, D= Poor, B= Blackpoint, G= Green4/ Purified5/ Standard Color Score is 86/ Refer to Reference Mixogram for Numerical Curve Pattern

TABLE 12

1962 Crop Quality Data of Durum Wheat Varieties

Blend of Langdon and Fargo, North Dakota
Durum Single Row

Variety	Sel.No.	T.W.1/ Appear.3/	Kernel	1000 Kwt.	Wht. Pro.2/	% Lg.K.	% Med.K.	% Sn.K.	% Sem.4/	Specks/ 10Sq.In.	% Abs.2/	Visual Color5/	Mixogram Pattern6/
Langdon		59.8	H	38.5	13.0	50	48	2	57.6	33	32.7	3.5	5
LD398 x LD357 ² -ST464	61-2	59.3	HB	42.0	13.1	68	32	0	59.5	23	33.0	8.0	6
LDNx (STxLD379-LD357)	61-5	56.8	H	41.3	14.4	51	48	1	57.2	26	33.3	9.5	5
LDNx (STxLD379-LD357)	61-8	60.6	H	33.0	13.4	36	59	5	57.5	30	33.0	8.5	6
Wells		60.4	H	29.1	13.6	25	69	6	57.2	36	33.0	8.5	5
LDNx (STxLD379-LD357)	61-9	60.2	H	32.7	13.2	29	65	6	56.3	33	32.7	9.0	5
LDNx (STxLD379-LD357)	61-10	61.2	H	35.3	12.9	35	61	4	57.2	36	31.7	8.5	3
LDNx (STxLD379-LD357)	61-11	60.7	H	42.7	13.5	58	41	1	59.0	33	33.3	8.5	4
LDNx (STxLD379-LD357)	61-12	59.8	H	40.2	13.1	56	42	2	59.7	23	33.0	8.5	6
Ramsey x Lakota	61-14	57.9	H	34.1	14.1	38	58	4	58.0	23	32.7	9.0	7
Wells x Br170	61-20	58.8	H	33.7	13.5	29	65	6	59.2	33	33.3	9.5	6
Wells x Br170	61-21	58.4	H	34.0	13.0	36	60	4	58.3	33	33.0	9.5	7
Lakota		56.9	H	31.2	14.2	33	61	6	57.7	30	33.3	9.5	7
Wells x Br170	61-23	59.0	H	32.1	12.6	20	73	7	58.3	33	33.0	8.0	6
Wells x Br170	61-24	58.0	H	33.8	13.5	26	69	5	58.3	26	33.3	8.5	6
Br170 x LD390	61-39	58.3	H	32.5	13.6	28	67	5	58.2	33	33.7	8.5	7
Br180 x Wells	61-40	60.2	H	34.1	13.5	39	58	3	58.2	30	33.0	9.0	3
Br180 x Wells	61-41	59.2	H	38.2	14.3	46	53	1	59.3	33	33.7	9.5	5
Br180 x Wells	61-42	60.4	H	39.1	14.3	52	47	1	59.3	36	33.7	9.5	6
Langdon		60.2	A	40.2	13.0	56	43	1	59.1	33	33.0	8.5	5
Langdon x Br134	61-53	59.9	H	42.9	13.1	61	38	1	62.0	36	33.3	7.5	6
Langdon x Br134	61-54	60.5	A	42.7	12.7	64	35	1	60.7	30	33.0	7.5	6
Langdon ² x ST464	61-57	60.8	H	40.6	12.9	44	55	1	61.9	33	33.3	7.5	6
LD408 x LD371-ST	61-63	59.7	H	32.3	13.0	30	65	5	58.4	23	31.0	9.0	2
LD408 x LD371-ST	61-64	59.6	H	32.6	13.5	22	72	6	57.5	30	31.7	7.5	5
LD408 x LD371-ST	61-65	59.8	H	30.7	13.0	11	82	7	57.2	23	30.7	8.5	2
Wells		60.9	H	34.4	13.8	36	61	3	57.2	26	32.7	7.5	4
LD408 x LD371-ST	61-67	59.9	A	32.2	13.0	14	77	7	58.5	33	31.7	7.5	3
LD408 x LD371-ST	61-68	58.9	H	31.9	13.0	22	71	7	56.8	26	31.3	7.5	3
Lakota		58.4	H	33.9	13.5	32	63	5	57.5	23	33.0	7.5	7
Wells x Langdon	61-79	61.5	H	31.6	12.7	26	68	6	57.0	26	32.3	8.5	3
Langdon		59.3	H	34.8	13.1	28	69	3	59.0	26	33.0	8.0	6
Wells x Langdon	61-80	61.0	H	29.2	13.0	22	72	6	58.0	26	32.3	7.5	3
Wells x Br183	61-17	59.8	H	37.3	13.9	43	55	2	59.5	23	33.3	7.5	6
Wells x Br183	61-18	59.5	H	34.4	13.8	33	63	4	59.6	30	33.3	7.5	7
Wells x Br170	61-28	58.0	H	29.6	13.6	16	77	7	57.3	33	33.3	8.0	7
Wells		59.8	H	31.4	14.3	18	76	6	54.8	26	33.3	8.5	6
Wells x Br170	61-30	58.8	H	37.3	14.3	42	56	2	57.1	30	34.0	7.5	7
Wells x Br170	61-33	58.5	H	29.2	14.5	16	74	10	52.9	20	33.7	9.0	7
Br180 x Wells	61-45	59.3	H	29.6	14.4	4	86	10	55.5	26	33.3	6.5	7
Br180 x Wells	61-46	59.3	H	33.4	14.4	24	73	3	57.4	23	34.0	8.5	7
Lakota		56.5	H	27.2	14.3	20	72	8	56.6	26	34.3	8.5	8
Br180 x Wells	61-47	60.5	H	35.1	14.5	27	73	2	57.6	30	34.3	8.5	8
Br180 x LD480	61-78	60.0	H	32.3	14.0	23	72	5	57.9	26	33.7	8.5	7
Langdon ² x ST464	61-58	58.5	H	32.9	13.8	25	73	2	58.4	26	33.3	8.5	6
Langdon ² x ST464	61-59	59.3	H	37.7	13.7	35	63	2	60.0	33	33.3	8.5	6
LD408 x LD371-ST	61-69	58.5	H	28.9	13.2	6	85	9	58.3	26	32.0	7.5	5
Langdon		59.0	H	37.0	13.2	32	64	4	58.0	23	33.3	8.0	4
Lakota		56.5	H	27.4	13.9	20	72	8	55.0	26	33.7	7.5	7
LD408 x LD371-ST	61-74	58.5	H	29.8	14.5	8	83	9	57.9	33	32.7	9.0	3

1/ Unofficial

2/ 14% Moisture Basis

3/ A= Excellent, H= Fairly Good, D= Poor, B= Blackpoint, G= Green

4/ Purified

5/ Standard Color Score is 8

6/ Refer to Reference Mixogram for Numerical Curve Pattern

TABLE 13

Klamath Falls, Oregon - Durum Wheat Samples - Sentry Variety
1962 Crop

	Cor- nett	Urb- ach	Blohm	Unruh	Brow- ning	Stast- ney	Ken- yon	Short	Jacob	Micka	Rajnus	Liesh	Rein- miller	Rajnus	Schm- idli	Sven- son	D&B
Wheat																	
T.W. 1/	65.4	64.7	64.0	65.2	65.2	64.9	64.5	64.9	64.9	64.6	64.6	66.2	65.5	66.0	64.4	64.9	63.5
Grade 1/	1HAD	1HAD	1HAD	1HAD	1HAD	1HAD	1HAD	1HAD	1D	1HAD	1HAD	1HAD	1HAD	1HAD	1HAD	1HAD	1HAD
% V.K.	85	85	95	95	95	95	95	90	40	90	90	75	85	95	90	90	85
Wht.Pro. 2/	10.5	11.5	14.2	12.7	13.2	12.6	13.0	11.2	9.6	11.9	12.9	9.6	10.6	11.3	12.3	12.1	13.4
1000 kwt.	41.6	39.0	35.4	43.8	42.2	40.4	39.5	38.9	44.8	39.0	38.9	41.5	41.3	42.9	38.3	42.0	40.7
% Lg. K.	66	55	40	65	65	56	52	53	76	50	49	64	60	72	47	66	58
% Md. K.	33	44	56	33	33	42	47	44	24	49	50	36	39	28	52	33	39
% Sm. K.	1	1	4	2	2	2	1	3	0	1	1	0	1	0	1	1	3
Semolina																	
% Yield 3/	61.5	61.2	60.8	62.8	62.1	61.9	62.0	59.3	56.1	61.2	59.9	61.6	60.3	62.4	59.7	61.2	61.4
Ash 2/	0.60	0.64	0.71	0.66	0.69	0.62	0.69	0.65	0.64	0.66	0.60	0.63	0.57	0.67	0.57	0.65	0.71
Sp/10 sq.in.	23	30	30	20	30	23	20	10	13	20	20	13	17	30	17	17	30
% Abs. 2/	27.4	27.3	26.7	27.0	27.2	25.8	25.7	27.1	30.4	26.4	27.7	29.9	30.3	26.9	25.7	27.4	26.2
Color 4/	9.5	8.5	10.0	7.5	8.5	7.5	7.5	8.5	8.5	7.5	9.5	8.5	8.5	7.5	8.0	7.5	7.5
Farino.Type 5/	2	2	2	2	2	2	2	2	4	2	2	2	2	2	2	2	2
Farino.Absp.2/	25.6	26.4	27.8	26.9	27.0	25.5	25.8	26.5	26.1	26.5	26.8	26.8	25.7	26.3	26.2	27.0	26.6

1/ Unofficial

2/ 14% Moisture Basis

3/ Purified Semolina

4/ Standard Color Score is 8

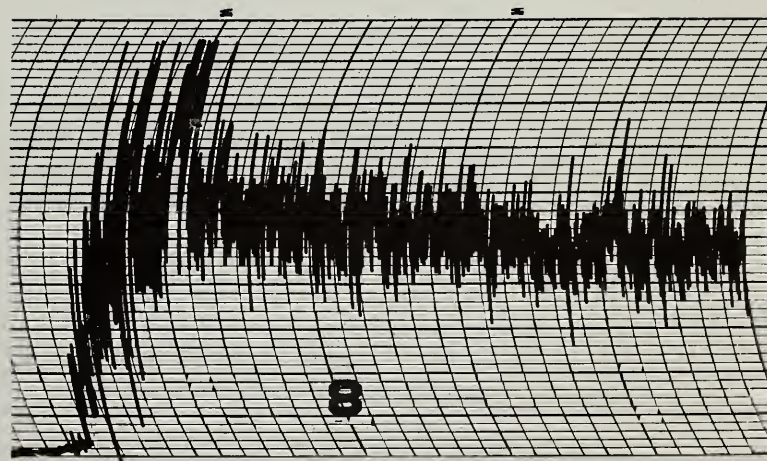
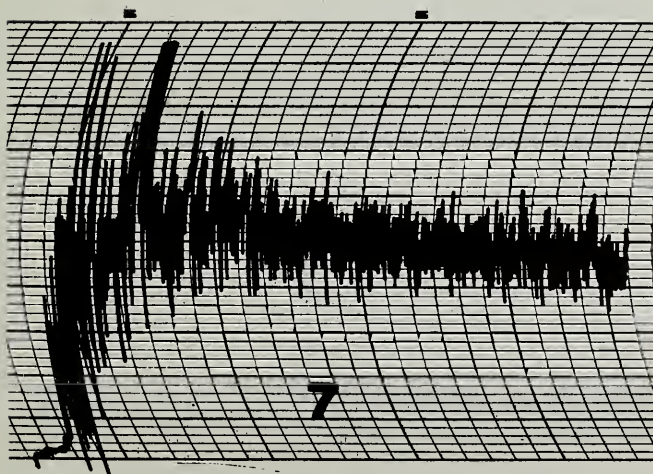
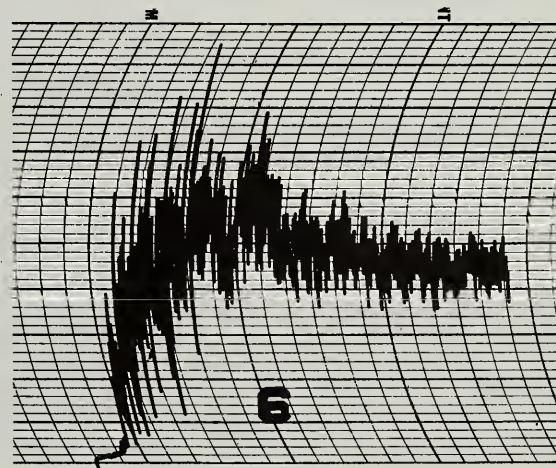
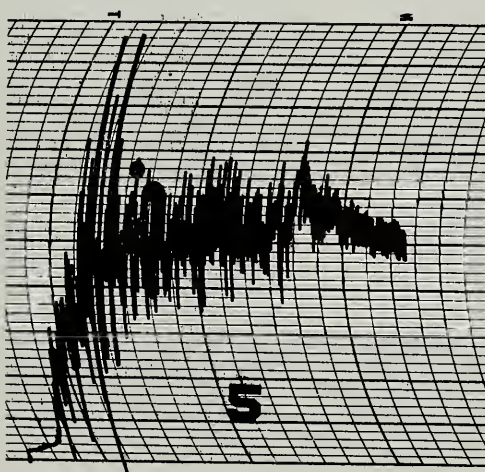
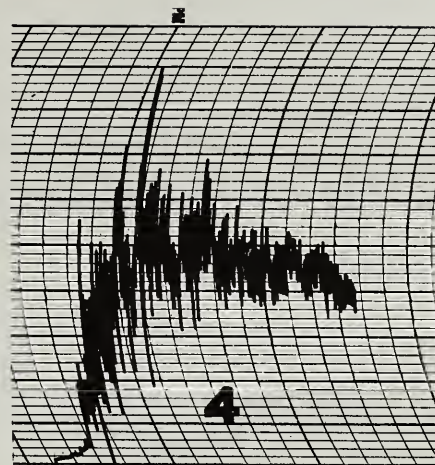
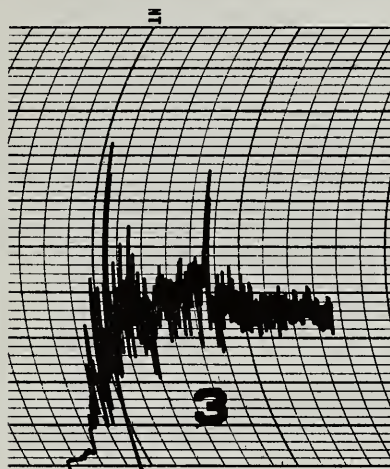
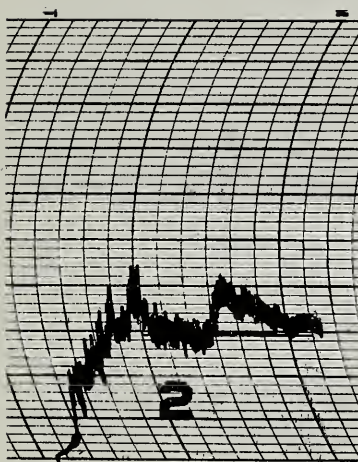
5/ Refer to Reference Farinograms for Numerical Curve Pattern

TABLE 14
1962 Crop Quality Data of Durum Wheat Varieties
Project 47 Samples

Variety	Carlota	Kernel T.W. <u>1/</u>	Appear. <u>1/</u>	% V.K.	1000 Kwt.	Wht. Pro. <u>2/</u>	% Lg.K.	% Med.K.	% Sm.K.	% Semo. <u>3/</u>	Ash <u>2/</u>	Specks / 10 Sq.In.	% Abs. <u>2/</u>	Visual Color <u>4/</u>	Mix. Rate <u>5/</u>	Mix. Abs. <u>2/</u>
P 47-1	7 Carlota	61.3	1 HAD	85	33.6	12.0	30	65	5	58.0	.66	20	28.8	9.0	4	27.6
P 47-2	7 Carlota	61.3	1 HAD	85	30.2	12.0	23	70	7	58.4	.66	17	28.8	9.0	4	27.1
P 47-3	6 Carlota	62.1	1 HAD	75	33.1	10.8	36	68	2	57.8	.65	20	30.1	9.0	4	27.0
P 47-4	6 Carlota	62.1	1 HAD	70	34.1	10.7	35	62	3	57.3	.66	13	29.2	9.0	4	26.8
P 47-5	10 Carlota	62.0	1 HAD	85	33.1	13.1	28	69	3	60	.65	23	28.1	8.5	4	28.1
P 47-6	10 Carlota	62.2	1 HAD	85	32.6	12.9	28	68	4	60.1	.67	23	26.8	8.0	4	28.1
P 47-7	10 Carlota	62.0	1 HAD	90	33.2	13.1	27	69	4	59.9	.64	20	27.9	9.0	4	28.0
P 47-8	15 Carlota	60.5	2 HAD	90	32.3	12.8	17	70	13	60.0	.70	27	28.0	8.5	4	27.7

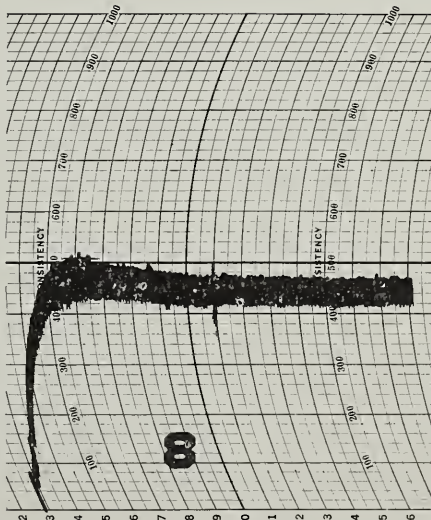
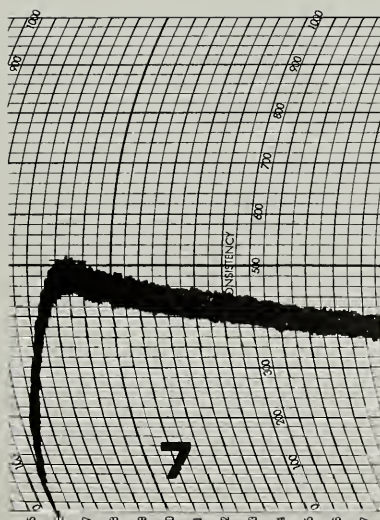
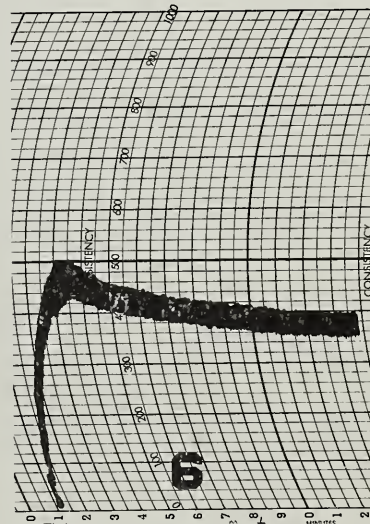
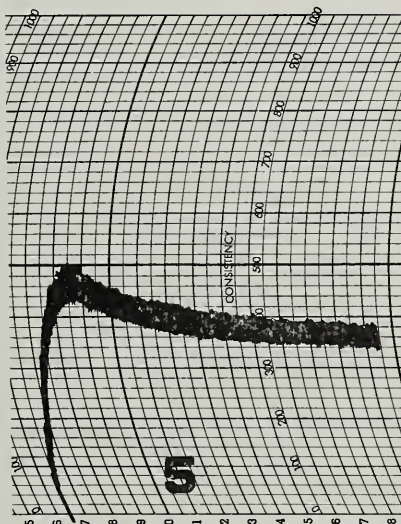
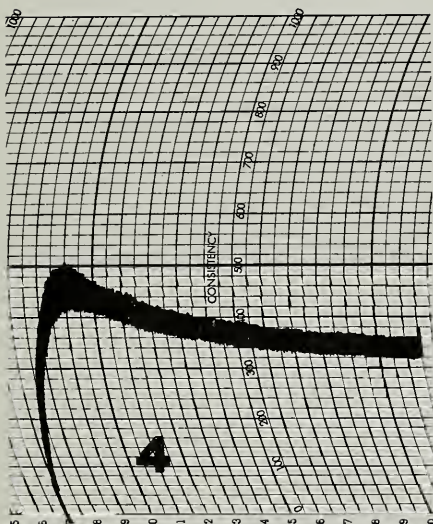
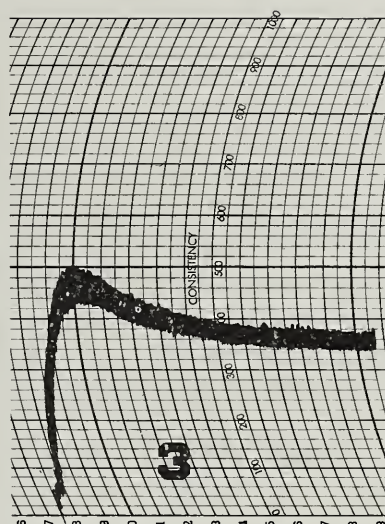
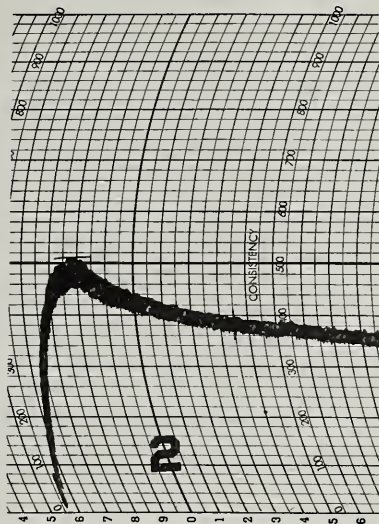
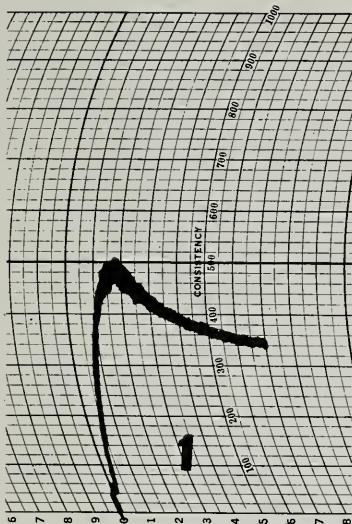
- 1/ Unofficial
2/ 14% Moisture Basis
3/ Purified Semolina
4/ B= Brown, R/B= Red/Brown, Standard Color Score is 8
5/ Refer to Reference Mixograms for Numerical Curve Pattern

NORTH DAKOTA STATE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF CEREAL TECHNOLOGY



REFERENCE MIXOGRAMS
DURUM WHEAT

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AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF CEREAL TECHNOLOGY



REFERENCE FARINOGRAMS
DURUM WHEAT

